CLAIMS

What is claimed is:

1. A method for routing a packet having a packet header containing routing information through a packet switching network composed of nodes, the method comprising

in an ingress node of the packet switching network receiving the packet,

translating the routing information into a fixed route encoded as a sequence of in-band control signals,

fragmenting the packet into cells of a fixed length, and

affixing the sequence of in-band control signals in front of each of the cells,

deploying each of the in-band control signals in the sequence in a corresponding sequence of nodes on the route to guide each of the cells through the sequence of nodes and consuming said each of the in-band control signals in said corresponding sequence of nodes, and

at an egress node of the packet switching network, reassembling the cells into the packet.

2. A method for routing a packet through a packet switching network composed of a plurality of nodes such that each of the nodes includes a switching fabric and a

plurality of line cards each containing an input module and an output module, the packet carrying a packet header containing the routing information and destined to traverse the network via a route which is determined by a sequence of k nodes, $k \geq 1$, wherein the first of the sequence of nodes is the ingress node through which the packet enters the network, the last of the sequence of nodes is the egress node through which the packet exits from the network, and wherein each of the nodes on the route has an active input module through which the packet enters the node and an active output module through which the packet exits from the node, the method comprising

at the active input module of the ingress node, translating the routing information in the packet header into a sequence of k in-band control signals corresponding to the sequence of k nodes on the route, fragmenting the packet into a plurality of cells of a fixed length, and affixing the sequence of k in-band control signals to each of the cells,

propagating each of the cells through the switching fabric of the j-th node on the route to an output port of the switching fabric which connects to the next node on the route by using the j-th in-band control signal so that: at each of the active input modules of the nodes on the route other than the ingress node, receiving each of the cells from the last preceding one of the nodes on the route; and at each of the active output modules of the nodes on the route other than the egress node, transmitting each of the cells to the next succeeding one of the nodes on the route, and

at the active output module of the egress node, reassembling the cells into the packet.

3. Circuitry for routing a packet having a packet header containing routing information comprising

an ingress node for receiving the packet, said ingress node including

a translator for translating the routing information into a fixed route encoded as a sequence of in-band control signals,

fragmentation means for fragmenting the packet into cells of a fixed length, and

means for affixing the sequence of in-band control signals in front of each of the cells,

a sequence of nodes along the route, the first one of the sequence being linked to the ingress node, each of the sequence of nodes including means for deploying a corresponding one of the in-band control signals to guide each of the cells through said each of the sequence of nodes and means for consuming said corresponding one of the in-band control signals in said each of the sequence of nodes, and

an egress node on the route, coupled to the last of the sequence of nodes, including means for reassembling the cells into the packet.